



TRI-CHEM CORPORATION

Epoxy & Urethane Training Program

800.456.6255 | tri-chem.com

WHY COATINGS FAIL

73%

POOR SURFACE PREPARATION

Regardless of the condition on the substrate, surface prep is the most important factor in the success of a coating system. Do not cut corners, no matter how great the product is.

18%

EXCESSIVE MOISTURE

If a concrete substrate contains too much water, pressure will force moisture to the surface and will not allow for proper adhesion. Testing for moisture vapor emission rate is vital.

5%

POOR INSTALLATION

5% of failures are attributed to poor methods and contractor error—not enough thickness, improperly mixed material, improper product temperature, etc. There is no excuse for careless and sloppy work.

4%

JOB SITE CONDITIONS

It is important to understand proper job site conditions and be aware of any obstacles that could prevent a successful application—excessive air movement, inadequate temperatures, moisture, etc.

WHAT WE CAN COAT

- Concrete
- Wood
- Metal
- Drywall
- VCT
- Ceramic & Quarry Tile
- Existing Coatings

“

We don't just sell products—we are experts at guiding our customers to the most cost- and time-effective solutions for meeting specific application requirements. We have 50 years of experience and industry expertise that aids us in developing some of the best field and time-tested patches, coatings and sealers on the market.

The only products we offer are the ones that perform. Period

WHAT IS CONCRETE?

- Water
- Cement
 - *Mixture of limestone and clay heated in a high temperature kiln, then pulverized into a powder*
- Fine and coarse aggregates
- Air

No two slabs of concrete are exactly the same!

The only two things we know about every piece of concrete – it gets hard and it cracks.



1

SURFACE PREPARATION

CONCRETE

CONCRETE SURFACE PREP

- Surface prep is the most critical component of any coating project, and when done properly, will increase the probability of long-term bond and system integrity.
- Our goal: maximize the strength of the coating bond with the concrete
- Things to consider when deciding prep method:
 - How stable is the concrete?
 - How clean is the concrete?
 - Job requirements/limitations
 - Products to install

3 MOST COMMON METHODS OF PREP

Least common methods:

- Acid etching
- Hydro-blasting
- Flame-blasting
- Scabbling

METHOD	DESCRIPTION	PROS	CONS
SHOT-BLASTING	Roughens horizontal surfaces for sealers, coatings and overlays. Removes some existing coatings.	<ul style="list-style-type: none">- Uniform profile- Large projects complete quickly- Virtually dustless- Removes sealers/profiles	<ul style="list-style-type: none">- Costly equipment- Large electrical needed- Can leave "corn rows"
GRINDING	Using various diamonds and composites, applied under pressure to achieve desired profile.	<ul style="list-style-type: none">- Equipment advances allows options- Equipment less costly- Usually run off limited power- Flattens floor use less product	<ul style="list-style-type: none">- Can be dusty- Can produce uneven profile- Less output than shot-blaster
SCARIFYING/MILLING	Mostly for removal of existing coatings and/or contaminated substrates, rotary action of toothed cutters leave a deep profile.	<ul style="list-style-type: none">- Deep profiling- Flattens high spots- Removes contamination	<ul style="list-style-type: none">- Very aggressive profile- Can cause micro-cracking- Expensive to operate- Milling equipment hard to locate

SURFACE PROFILES

ICRI (International
Concrete Repair
Institute) has
identified 10 distinct
profile ranges for
concrete surfaces.*

**ICRI GUIDELINE NO. 03732/
MOST COMMON PROFILES*

CONCRETE SURFACE PROFILE (CSP)	MILS (+/- 5)	RECOMMENDED PREP	INSTALLATION EXAMPLES
1	27	Light grind/acid etch	Sealers/thin-film
2	32	Grind	Sealers/thin-film
3	38	Grind/light blast	Thin-film/light-medium duty
4	50	Heavy grin/shot-blast	High-build/heavy-duty
5	66	Shot-blast	Heavy-duty/self-levelers
6	124	Heavy shot-blast/light scarification	Self-levelers/overlays
7	175	Heavy shot-blast/light scarification	Overlays
8	210	Scarification	Overlays
9	214	Heavy scarification	Overlays



Un-Prepped Concrete

Uniform CSP-2/3 Prepped Concrete

OUR MAIN GOAL

2

PATCHES & JOINT FILLERS

TWO TYPES OF CRACKS

STATIC

HAIRLINE CRACKS

Static cracks are typically hairline-sized and don't typically grow or spread further.

DYNAMIC

STRUCTURAL CRACKS

Dynamic cracks are typically a function of new construction or a change in the load on concrete (new machinery). These will usually continue to crack and have chipping on each side.



THREE TYPES OF JOINTS

CONTROL

Controlled cracking – most common

EXPANSION JOINTS

Usually around perimeter and columns

COLD JOINTS

When a new slab pour edge touches the edge of another slab

FLEXIBLE JOINT SEALER FAST SET

- Resilient expansion joint filler
- Two-component, 100% solids polymer dual cartridge system
- Flexible when cured
- Chemical resistant
- Semi-clear, unpigmented



663 RAPID REPAIR PASTE

- 100% solids epoxy adhesive for fast-track repairs
- Two-component compound applied with a dual cartridge kit, a putty knife, trowel or plastic applicator
- Repairs chips, defects, small voids, or “honeycombing” in horizontal and vertical concrete
- Rapid cure time



EXTREME PATCH

- Heavy-duty, high compression strength floor patch
- Repairs and resurfaces damp and damaged plant floors, fills and eliminates expansion joints, and anchors machinery
- 100% solids epoxy
- Cures on damp concrete
- Available in a variety of colors



3

PRIMERS, COATING & SEALERS

BASIC APPLICATION TOOLS

- Spiked shoes
- Squeegee & extension pole
- Roller covers and pole
- “Cut” brushes
- Rags, gloves, tape
- Drill & mix blade
- Mix station protection (one of the following):
 - Tarps
 - Cardboard
 - Dropcloth

BEFORE STARTING: CONDITION YOUR MATERIAL

- Materials flow best when they are allowed to “acclimatize”, or get to the temperature of the project
- Colder materials become very difficult to apply due to an increase in viscosity – also referred to as CPS (Centipoise)
- During warmer temperatures, you can “slow” materials down by keeping the B side or hardener chilled

CPS

Described as a unit of dynamic of viscosity, **centipoise** is the amount of force necessary to move a layer of liquid in relation to another liquid. Centipoise is considered the standard unit of measurement for fluids of all types. It is one hundredth of a *poise*. The symbol for centipoise is **CP** or **cps**, depending on the source.

Though centipoise may seem a very technical and difficult to understand term, understanding it is simple once you have a firm grasp of *viscosity*. **Viscosity** is the measure of a fluid's resistance to flow. An easy way of understanding it is to think of viscosity as fluid friction. Thinner liquids, such as water, have lower viscosities, while thicker liquids like oil have higher viscosities.

LIQUID

~CPS

WATER

1 CPS

HUMAN BLOOD

10 CPS

OLIVE OIL

80 COS

MOTOR OIL 40W

320 CPS

233 LV

650 CPS

233 HV

1300 CPS

MOLASSES

5000 CPS

USING A WET FILM GAUGE



- Wet film gauges are designed to be used to check the “wet film thickness” in real time, as the product is being applied.
- Hold the gauge at a 90 degree angle making sure the “teeth” contact the substrate or the previous cured coat. Press firmly – you won’t break it!
- Remove the gauge and examine the last notch to have “wet” material on it...that is the thickness.
- Clean the gauge by wiping it on a rag immediately to prevent the material from getting built up, and ready to use on future projects.
- Wet film readings should be taken throughout the project to insure the proper amount of liquid is being applied. This will also give you a good indication and will help eliminate running low or completely out of material prior to the projects completion.

WHY USE A PRIMER?

- Lower cost than “body coats”
- Some primers can help with MVTR (Moisture Vapor Transmission Rate)
- Lower viscosity helps:
 - Penetrate deeper to force out air in concrete
 - Eliminate “out gassing” blisters and “fish-eyes”
 - Subsequent coats adhere

TRI-CHEM ROCK DTM

- Direct to metal coating designed to bond to marginally prepared steel, concrete, fiberglass and galvanized metal
- High corrosion and chemical resistance
- Can be used as a tank lining primer and finish coat
- High solids
- Contains rust-inhibiting Micaous Iron Oxide



HYDRATION

- Hydration is the chemical reaction that occurs when water comes into contact with the cement particles
- Hydration only requires a water to cement ratio of .22:1
Or, for every pound of cement .22 lbs. of water
- Very hard to pour. Typical water-cement ratios are .4 to .6 are seen on job sites
- Extra water is referred to as “Water of Convenience”

WATER- CEMENT RATIOS

Why is this important?

- Higher w:c ratios increase the drying time of concrete
- Higher w:c ratios create more porous concrete
- Water that is not consumed by hydration will leave microscopic pores as excess water leaves the slab
- w:c ratios greater than .5:1 have a much higher chance of Moisture Related Problems

CURING AND DRYING OF CONCRETE

CURING

Curing is often defined as providing adequate moisture, temperature, and time to allow the concrete to achieve the desired properties of strength and durability.

Curing can be sped up by temperature, air movement, dehumidifiers and HVAC.

DRYING

Drying is defined as providing the proper conditions to allow the concrete to achieve a moisture condition appropriate for its intended use.

Moisture content is of significant importance when it comes to floor finishes like vinyl, VCT, carpet, non-breathable coatings like Epoxy.

MVTR: MOISTURE VAPOR TRANSMISSION RATE

- **Where Does Moisture in concrete come from?**
 - Residual moisture from the placing of the concrete – Water of Convenience
 - Leaking Water Sources
 - Ground Water
 - Inadequate Grade
 - Down Spouts
 - Tiles Plugged up

SLIP RESISTANCE

- The non-skid property of any floor surface is quantified by a measurement of Coefficient of Friction (CoF)
 - CoF is the ratio of the force that maintains contact between an object and a surface and the frictional force that resists the motion of the object. Determined by a value between .01 and 1.00.
- OSHA recommends a CoF 0.5 or greater
- Americans with Disability Act (ADA) recommends CoF of 0.6 or greater and 0.8 for ramps
- We can test the CoF with a Tribometer

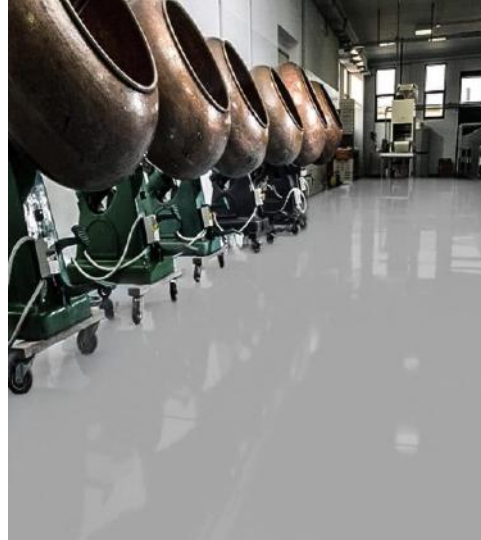
SLIP RESISTANCE

- PCA337 (40/60 mesh plastic beads) CoF = $\sim .54$
- PCA334-60 (60 grit aluminum oxide) CoF = $\sim .59$
- PCA322 (35/50 angular quartz) CoF = $\sim .67$
- PCA336 (240 grit aluminum oxide) CoF = $\sim .69$
 - Mixed into WB urethane at 1.42 pounds per gallon
- PCA323 (40/60 angular quartz) CoF = $\sim .70$
- PCA334 (46 grit aluminum oxide) CoF = $\sim .74$

All testing conducted using a Tribometer on a dry, horizontal substrate using a leather sole and represents an average texture for the sample. Field results will vary.

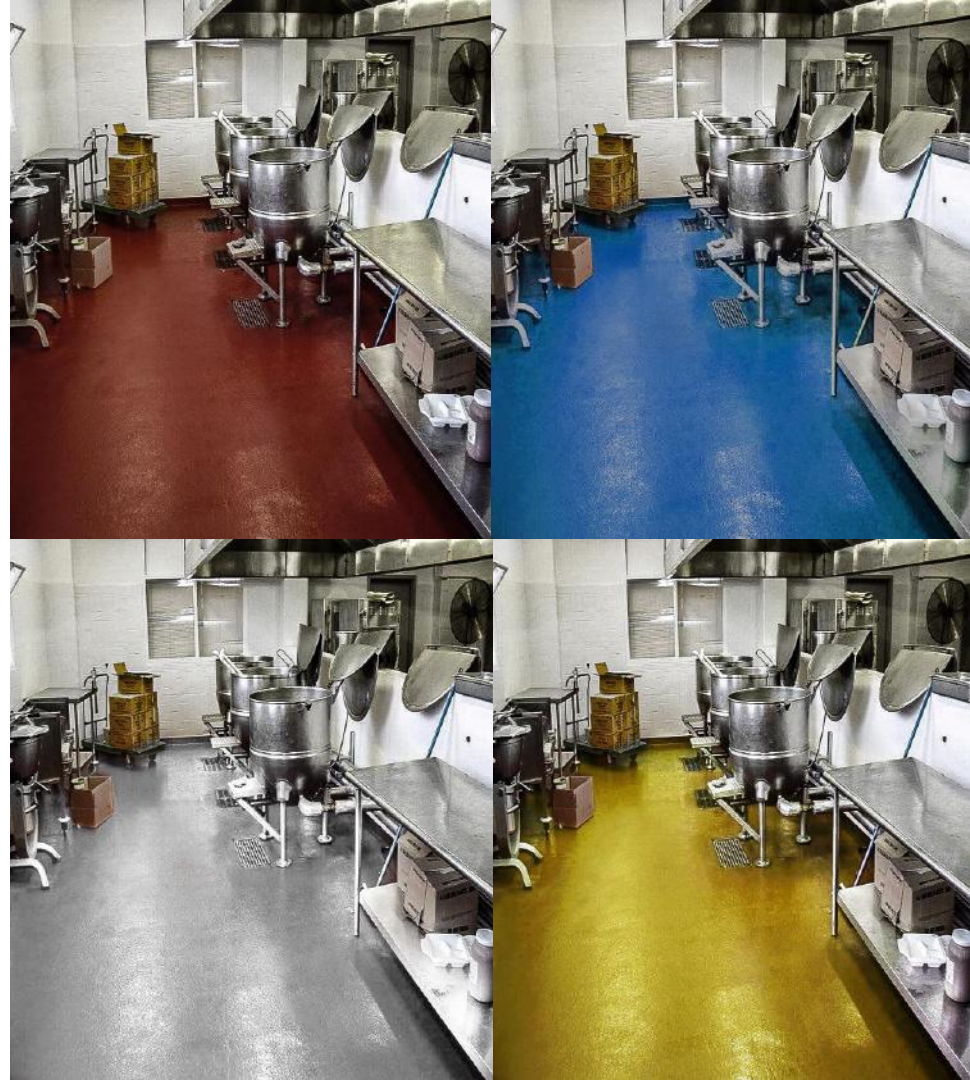
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- 100% solids epoxy coating available in Low Viscosity (LV) and Medium Viscosity (MV)
- High abrasion resistance
- 2-component, multi-use coating
- Used where a water clear or solid color high build neat coating is required
- Available in a variety of colors



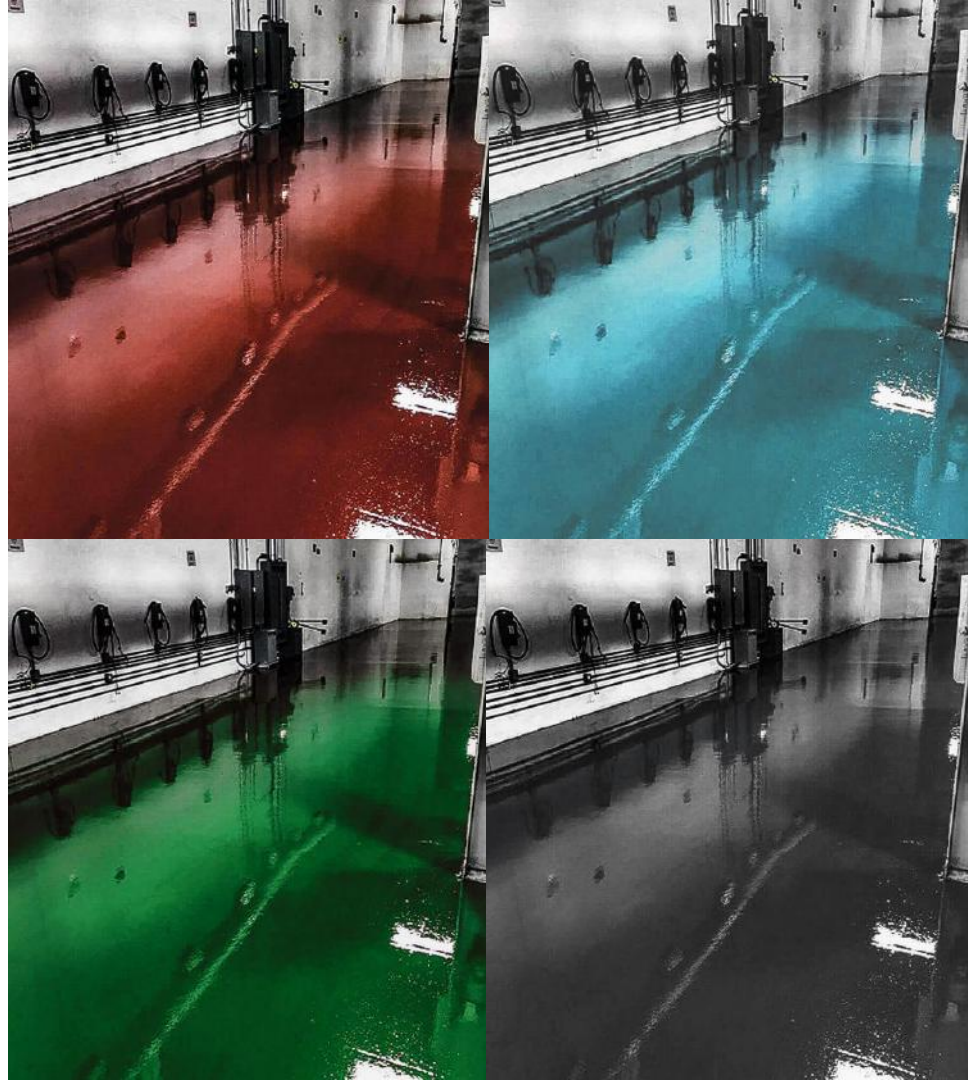
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- High solids cementitious urethane flooring system
- Available in Slurry-Applied (SL), Trowel-Applied (TR) and a dressing topcoat (D)
- Ideal for food and beverage processing plants and commercial kitchens
- Tolerates large temperature swings
- Available in a variety of colors



NOVOLAC EPOXY

- Highly chemical-resistant, 100% solids epoxy coating
- Resists harsh chemicals, including sulfuric acid
- Can be used as a topcoat over epoxy or polyurethanes
- Available in a variety of colors



144 WATER-BASED URETHANE SEALER

- Water-based – no harmful solvents
- Impact, abrasion and chemical resistant
- Easy to clean and maintain – eliminates waxing and reduces product labor
- Available in gloss and low luster
- Can be used on VCT, concrete, epoxy, tile and grout, wood, terrazzo, metal, dry wall, fiberglass, foam, paint and more



4

TRAINING PROGRAM

TRAINING PROGRAM

**Epoxy & Urethane Training:
Prep. Patch. Coat. Seal.**

Forget hiring contractors
and train your entire staff in
just 6-8 hours!

- ☐ Identify problem areas
- ☐ Properly prep concrete, metal, wood and more
- ☐ Prep by shot-blasting, grinding or scarifying/milling
- ☐ Achieve the proper surface profile before coating
- ☐ Patch vertically and horizontally
- ☐ Fill and eliminate concrete cracks
- ☐ Coat and seal vertically and horizontally
- ☐ Apply safety lines